Significant improvement of room-temperature formability of a damping magnesium alloy

Expansion of application range of a magnesium alloy as damping components

We have developed a new rolling process for improving room-temperature formability of a damping magnesium alloy (M1 alloy). In the new rolling process, while a conventional rolling machine is used, the room-temperature formability of magnesium alloys is improved by controlling the annealing temperature and the rolling temperature. The sheet rolled by the new process exhibits excellent room-temperature formability close to that of an aluminum alloy (Erichsen value: 7.9), because the magnesium crystals in the texture of the sheet are less aligned than those of the conventional rolled sheets. The sheet rolled by the new process also exhibits good damping capacity. Thus, it is expected that magnesium alloy products as damping components can be easily processed by press-forming at room temperature.

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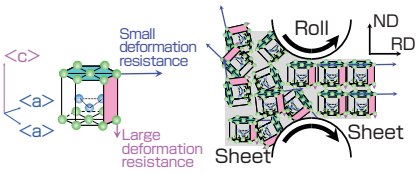
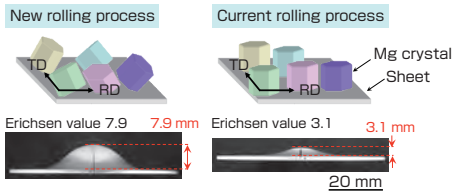


(Left) Anisotropy of deformation resistance of magnesium crystal at room temperature (Right) Texture formation of magnesium during rolling process



(Top) Schematic view of crystal orientation of the M1 alloy sheets processed by the new rolling process and conventional rolling process (Bottom) Results of the Erichsen test for the M1 alloy sheets

Easy-dispersible core-shell type nanoparticles

Expectation for optical film applications

Ceramic nanoparticles attract attention because they are expected to have very unique functions due to their size. Nanoparticles, however, have a big problem that they are easily aggregated, especially in the case of nanoparticles with the size of 50 nm or less. We have developed easy-dispersible core-shell type nanoparticles of which the size is approximately 22 nm. The nanoparticles have a core-shell structure in which the core is cerium oxide with good crystallinity and the shell is a lyophilic polymer, and they can be easily dispersed into water or alcohol.

When the nanoparticles have bad dispersibility, the film including such nanoparticles is generally cloudy. We can, however, obtain highly transparent photo-curing resin films including the core-shell nanoparticles, which have UV cutting property and high refractive index. This film would be used for anti-reflection film. Now we are searching for other applications of the core-shell type nanoparticles.

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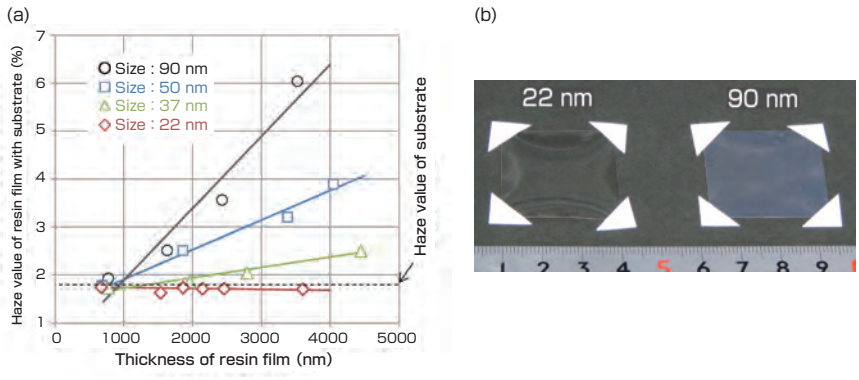

(a) Relationship between thickness and haze value and (b) photograph for photo-curing resin film including 30 wt% core-shell type ceria nanoparticles